

What is claimed is:

1           1.     A system for interacting with displays and all devices that use  
2     such displays comprised of  
3           a.     a display,  
4           b.     a sensor or camera,  
5           c.     a pointing device that can be registered by the sensor or  
6     camera,  
7           d.     a method for detecting the pointing device,  
8           e.     a method for establishing the mapping between the position of  
9     the pointing device and a corresponding location on the display.

1           2.     A system according to claim 1 wherein the sensor or camera,  
2     in addition to registering the image of the pointing object, can also register at least  
3     one of (i) the image of the display and (ii) the reflection or effect that the pointing  
4     device can produce on the display.

1           3.     A system as defined by claim 1 which commands the  
2     positioning of a pointing icon on the display.

1           4.     A system according to claim 1 wherein the pointing device is a  
2     part of the human body such as a hand or a finger, or an ornament or device worn on  
3     the human body such as a glove or thimble.

1           5.     A system according to claim 1 wherein the pointing device is  
2     used to point to regions of the display by way of changing its position,  
3     attitude, or presentation.

1           6.     A system according to claim 1 wherein the pointing device is  
2     used to define a particular point or region on the display.

1                   7.        A system according to claim 1 wherein the pointing device is  
2        used to define a vector on the plane of the display that indicates a direction  
3        and magnitude relative to or with respect to an item on the display or a  
4        region of the display.

1                   8.        A system according to claim 3 wherein the pointing icon on  
2        the display can be registered by the sensor or camera.

1                   9.        A system according to claim 8 which also includes a method  
2        for correcting the offsets between (i) the position of the pointing device, or reflection,  
3        or effect thereof on the display as observed by the user or by the sensor or the camera,  
4        and (ii) the position of the pointer icon on the display.

1                   10.      A system as defined by claim 1 which also includes at least  
2        one of the following:

- 3                   a.        a method for selecting or highlighting a specific item or icon  
4        on the display,
- 5                   b.        a method for activating a specific process, program, or menu  
6        item represented on the display, and
- 7                   c.        a method for writing, scribing, drawing, highlighting,  
8        annotating, or otherwise producing marks on the display.

1                   11.      A method for detecting the pointing device comprising  
2                   a.        retrieval of data or image from a sensor or camera, and  
3                   b.        analysis of the data or image from the sensor or camera to  
4        locate the pointing device in the data, or locating at least a set of the picture elements  
5        in the image that comprise the rendition of the pointing device.

1                   12.      A method according to claim 11 wherein the characteristics  
2        that distinguish the pointing device from other objects in the data from the

3 sensor or the image from the camera are known a priori.

1                   13.       A method according to claim 11 wherein the characteristics  
2 that distinguish the pointing device from other objects in the data from the sensor or  
3 the image from the camera are determined based analysis of at least one set of the  
4 data acquired from the sensor or one image acquired from the camera.

1                   14.       A method according to claim 13 wherein the characteristics  
2 that distinguish the pointing device from other objects, whose rendition are present in  
3 the data from the sensor or in the image from the camera, is obtained by

4                   a.       acquiring at least two sets of data from the sensor or at least  
5 two images from the camera, one with the pointing device in view of the sensor  
6 or the camera and one without, and

7                   b.       comparing the two sets with one another.

1                   15.       A method according to claim 11 wherein adjustments or  
2 modifications are made to the position, sensitivity, and other settings of the sensor or  
3 the camera pursuant the analysis of the data or image retrieved from the sensor or the  
4 camera.

1                   16.       A method according to claim 11 wherein at least part of the  
2 procedures for the method is carried out using at least in part the computing  
3 mechanisms available on one or more of the following: the display, or the sensor or  
4 camera, or the pointing device, or the device producing the signal shown on the  
5 display, or the device producing the pointing icon on the display.

1                   17.       A method for establishing the mapping between the set of  
2 positions that a pointing device can take and the set of corresponding locations on the  
3 display comprising:

4                   a.       defining the range of positions that the pointing device can

5 assume,

6 b. defining the boundaries of the range of positions that the  
7 pointing device can take with geometric representations,

8 c. transforming the geometric representation of the arrangement  
9 of regions on the display so that it fits optimally into the boundaries of the range of  
10 positions that the pointing device can take.

1 18. A method according to claim 17 wherein the range of positions  
2 that the pointing device may assume is defined by querying the user to point to a set  
3 of points on the display.

1 19. A method according to claim 18 wherein the range of positions  
2 that the pointing device can assume is defined by the boundary contours of the  
3 display as they are registered by the sensor or the camera.

1 20. A method according to claim 19 wherein at least one special  
2 display image is used to establish the mapping between the positions that a pointing  
3 device can take and a corresponding locations on the display.

1 21. A method according to claim 17 wherein at least part of the  
2 procedures for the method is carried out using at least in part the computing  
3 mechanisms available on one or more of the following: the display, or the sensor or  
4 camera, or the pointing device, or the device producing the signal shown on the  
5 display, or the device producing the pointing icon on the display.

1 22. A method for detecting the display comprising  
2 a. retrieval of data or image from a sensor or camera, and  
3 b. analysis of the data or image from the sensor or camera to  
4 locate the display in the data, or locating at least a set of the picture elements in  
5 the image that comprise the rendition of the display in the image.

1                   23.    A method according to claim 22 wherein the characteristics  
2    that distinguish the display from other objects in the data from the sensor or the  
3    image from the camera are known a priori.

1                   24.    A method according to claim 22 wherein the characteristics  
2    that distinguish the display from other objects in the data from the sensor or the  
3    image from the camera are determined based on analysis of at least one set of the data  
4    acquired from the sensor or one image acquired from the camera.

1                   25.    A method according to claim 22 wherein the display refers to  
2    the range of positions that the pointing device can take.

1                   26.    A method according to claim 24 wherein the characteristics  
2    that distinguish the display from other objects, whose rendition are present in the data  
3    from the sensor or in the image from the camera, is obtained by  
4                    a.    acquiring at least two sets of data from the sensor or at least  
5    two images from the camera, one with the display off in view of the sensor or the  
6    camera and one with the display on, and  
7                    b.    comparing the two sets with one another.

1                   27.    A method according to claim 22 wherein adjustments or  
2    modifications are made to the position, sensitivity, and other settings of the sensor or  
3    the camera pursuant the analysis of the data or image retrieved from the sensor or the  
4    camera.

1                   28.    A method according to claim 22 wherein at least part of the  
2    procedures for the method is carried out using at least in part the computing  
3    mechanisms available on one or more of the following: the display, or the sensor or  
4    camera, or the pointing device, or the device producing the signal shown on the

display, or the device producing the pointing icon on the display.